Alabama Department of Environmental Management

Ecological Reference Reach

Rivers and Streams Monitoring Program

2013 Monitoring Summary

Big Coon Creek at Jackson County Road 55 (34.85659/-85.92684)

BACKGROUND

The Alabama Department of Environmental Management (ADEM) monitored Big Coon Creek as part of the 2013 Assessment of the Tennessee River Basin (TN). The objectives of the TN Basin Assessments were to assess the biological integrity of each monitoring site and to estimate overall water quality within the TN basin.

Figure 1. Big Coon Creek at BCNJ-1, May 16, 2013.

Table 1. Summary of watershed characteristics.

Watershed Characteristics		
Basin		Tennessee River
Drainage Area (mi^2)		42
Ecoregion[a]		68b
% Landuse		
Open water		<1
Wetland	Woody	<1
Forest	Deciduous	80
	Evergreen	1
	Mixed	4
Shrub/scrub		3
Grassland/herbaceous		1
Pasture/hay		7
Cultivated crops		2
Development	Open space	1
	Low intensity	<1
Barren		<1
Population/km^2[b]		3

a.Sequatchie Valley

b.2000 US Census

WATERSHED CHARACTERISTICS

Watershed characteristics are summarized in Table 1. Big Coon Creek is a *Fish & Wildlife (F&W)* stream that drains north-central Jackson County. It runs roughly southeast along Jackson County road 53 towards its confluence with Little Coon Creek and later Crow Creek. Based on the 2011 National Land Cover Dataset, land use within the watershed is primarily forest (85%) with some pasture/hay. As of September 1, 2012, ADEM has issued no NPDES permits in the watershed.

REACH CHARACTERISTICS

General observations (Table 2) and a habitat assessment (Table 3) were completed during the macroinvertebrate assessment. In comparison with reference reaches in the same ecoregion, they give an indication of the physical condition of the site and the quality and availability of habitat. Big Coon Creek at BCNJ-1 is a low-gradient, glide-pool stream. The predominant instream substrate was sand (Figure 1). The overall habitat assessment resulted in a *marginal* rating due to poor bank and vegetative stability. Banks were very steep and root bank habitat was virtually non-existent.

BIOASSESSMENT RESULTS

Benthic macroinvertebrate communities were sampled using ADEM's Intensive Multi-habitat Bioassessment methodology (WMB-I). Table 4 summarizes results of taxonomic richness, community composition, and community tolerance metrics. Each metric is scored on a 100 point scale. The final score is the average of all individual metric scores. Metric results indicated the macroinvertebrate community in Big Coon Creek at BCNJ-1 to be in *fair* condition.

Table 2. Physical characteristics of Big Coon Creek at BCNJ-1, May 16, 2013.

Physical Characteristics		
Width (ft)		50
Canopy Cover		Estimate 50/50
Depth (ft)		
	Run	2.0
	Pool	4.0
% of Reach		
	Run	90
	Pool	10
% Substrate		
	Clay	5
	Cobble	1
	Gravel	14
	Sand	60
	Silt	15
	Organic Matter	5

Table 3. Results of the habitat assessment conducted in Big Coon Creek at BCNJ-1, May 16, 2013.

Habitat Assessment	%Maximum Score	Rating
Instream Habitat Quality	40	Poor (<41)
Sediment Deposition	59	Marginal (41-58)
Sinuosity	33	Poor (<45)
Bank and Vegetative Stability	25	Poor (<35)
Riparian Buffer	71	Sub-optimal (70-89)
Habitat Assessment Score	**106**	
% Maximum Score	**48**	**Marginal (41-58)**

Table 4. Results of the macroinvertebrate bioassessment conducted in Big Coon Creek at BCNJ-1, May 16, 2013.

Macroinvertebrate Assessment		
	Results	**Scores**
Taxa richness measures		**(0-100)**
# EPT taxa	9	22
Taxonomic composition measures		
% Non-insect taxa	13	46
% Dominant Taxon	17	86
% EPC taxa	23	42
Functional feeding group measures		
% Predators	5	16
Tolerance measures		
% Taxa as Tolerant	35	41
WMB-I Assessment Score	**---**	**42**
WMB-I Assessment Rating		**Fair (39-58)**

WATER CHEMISTRY

Results of water chemistry analyses are presented in Table 5. In situ measurements and water samples were collected April, June, August and October 2013 to help identify any stressors to the biological communities. In situ parameters were also measured during the macroinvertebrate assessment on May 16. The *F&W* human health criterion for Arsenic was exceeded on April 10, 2013. ADEM criteria for arsenic are expressed as dissolved trivalent arsenic (arsenite – As III). Presently studies are being conducted in order to provide a better understanding of the prevalence and areal distribution of dissolved trivalent arsenic to total arsenic in the State of Alabama. Upon conclusion of the studies Big Coon Creek will be reassessed for arsenic violations. Values for Total Dissolved Solids, Specific Conductance, Hardness, and Alkalinity were greater than expected for ecoregion 68. No organics samples were collected.

SUMMARY

Bioassessment results indicated the macroinvertebrate community to be in *fair* condition. Overall habitat conditions were *marginal*. Total dissolved solids, specific conductance, hardness and alkalinity condcentrations were greater than expected for ecoregion 68. Monitoring of Big Coon Creek at BCNJ-1 should continue to ensure that water quality and biological conditions remain stable.

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Table 5. Summary of water quality data collected between April, June, August, October 2013. Minimum (Min) and maximum (Max) values calculated using minimum detection limits (MDL) when results were less than this value. Median, average (Avg), and standard deviations (SD) values were calculated by multiplying the MDL by 0.5 when results were less than this value.

Parameter	N	Min	Max	Med	Avg	SD	Q
Physical							
Temperature (°C)	5	12.9	19.2	18.2	16.6	2.9	
Turbidity (NTU)	5	3.3	6.0	3.9	4.3	1.1	
Total Dissolved Solids (mg/L)	4	112.0	141.0	129.0 M	127.8	12.6	
Total Suspended Solids (mg/L)	4	< 1.0	8.0	0.8	2.5	3.7	
Specific Conductance (µmhos)	5	187.5	274.7	237.0 G	225.5	37.1	
Hardness (mg/L)	4	97.9	135.0	118.0 G	117.2	15.5	
J Alkalinity (mg/L)	4	97.3	< 136.0	116.5 M	116.6	15.8	
Stream Flow (cfs)	5	6.2	80.0	23.9	36.3	31.5	
Chemical							
Dissolved Oxygen (mg/L)	5	7.2	9.7	8.3	8.4	1.0	
pH (su)	5	7.5	7.7	7.6	7.6	0.1	
J Ammonia Nitrogen (mg/L)	4	< 0.013	< 0.018	0.011	0.012	0.003	
Nitrate+Nitrite Nitrogen (mg/L)	4	0.144	0.365	0.296	0.275	0.094	
Total Kjeldahl Nitrogen (mg/L)	4	< 0.041	0.391	0.178	0.192	0.153	
Total Nitrogen (mg/L)	4	< 0.164	0.756	0.474	0.467	0.243	
J Dissolved Reactive Phosphorus (mg/L)	4	< 0.004	< 0.006	0.005	0.004	0.002	
J Total Phosphorus (mg/L)	4	< 0.007	0.014	0.011	0.011	0.003	
CBOD-5 (mg/L)	4	< 2.0	< 2.0	1.0	1.0	0.0	
Chlorides (mg/L)	4	1.1	1.3	1.3	1.2	0.1	
Total Metals							
J Aluminum (mg/L)	4	< 0.076	< 0.199	0.068	0.094	0.076	
J Iron (mg/L)	4	< 0.148	0.317	0.266	0.250	0.075	
J Manganese (mg/L)	4	< 0.020	0.054	0.034	0.035	0.014	
Dissolved Metals							
Aluminum (mg/L)	4	< 0.076	< 0.076	0.038	0.038	0.000	
Antimony (µg/L)	4	< 0.1	< 2.6	0.0	0.4	0.6	
J Arsenic (µg/L)	4	< 0.2	< 1.7 H	0.3	0.6	0.7	1
Cadmium (µg/L)	4	< 0.046	< 0.170	0.085	0.070	0.031	
J Chromium (µg/L)	4	< 0.918	< 32.000	1.210	4.834	7.446	
J Copper (mg/L)	4	< 0.0003	< 0.005	0.0003	0.002	0.003	
J Iron (mg/L)	4	0.033	< 0.109	0.062	0.066	0.033	
Lead (µg/L)	4	< 0.1	< 1.1	0.0	0.2	0.2	
J Manganese (mg/L)	4	< 0.018	< 0.041	0.029	0.029	0.009	
Mercury (µg/L)	1			<	0.057		
J Nickel (mg/L)	4	< 0.0002	< 0.016	0.001	0.002	0.004	
Selenium (µg/L)	4	< 0.2	< 1.4	0.1	0.3	0.3	
Silver (µg/L)	4	< 0.215	< 2.120	1.060	0.822	0.476	
Thallium (µg/L)	4	< 0.1	< 1.1	0.0	0.2	0.2	
J Zinc (mg/L)	4	< 0.002	< 0.017	0.003	0.004	0.003	
Biological							
Chlorophyll a (ug/L)	4	< 0.10	< 0.10	0.05	0.05	0.00	
E. coli (col/100mL)	4	66	291	117	148	101	

G=value greater than median concentration of all verified reference data collected in ecoregion 68; H=*F&W* human health criterion exceeded; J=estimate; M=value greater than the 90th percentile of all verified reference data collected in ecoregion 68; N=# of samples; Q=#samples where criteria exceedences are uncertain.